

REMARKS

Claims 1-13 and 17-20 are pending. Claim 17 is amended and new claims 19 and 20 are added.

Examiner Talbot is thanked for the courtesies extended to the undersigned attorney during the personal interview conducted on April 13, 2006. Applicants' separate record of the substance of that interview is incorporated into the following discussion.

Claims 1-9, 13, 17 and 18 were rejected under 35 USC §102(b) as being clearly anticipated by JP 62-60640. This rejection is respectfully traversed.

In the rejection, the Examiner asserts that "JP 62-60640 teaches sputtering or vapor depositing a metal atop a thermoplastic polyimide sheet and heating to form the laminated film. The metal can be copper. JP 62-60640 teaches bonding a copper foil to a polyimide substrate followed by heat treating to form the laminate." The Examiner's assertions are incorrect.

Claim 1 requires "forming at least one conductor layer directly adhering with at least one of the thermoplastic polyimide surfaces to obtain a laminate," as well as requiring "heating said laminate after said laminate is formed so that adhesion strength between the thermoplastic polyimide and the conductor layer is enhanced." In order for JP '640 to anticipate the features of claim 1, JP '640 must teach each and every limitation required by claim 1. JP '640 fails to teach each and every limitation of claim 1.

The paragraph bridging pages 6 and 7 of the English translation of JP '640 describes the method of producing the laminates of its invention. This paragraph describes two methods. In one method, compression molding is used to produce the laminates. In the other method, "not laminated with metal, the resin may be plated with metal through chemical plating, electroplating, sputtering or vapor deposition to produce the laminates of the invention." Nowhere does the translation indicate "sputtering or vapor depositing a metal atop a thermoplastic polyimide sheet and heating to form the laminated film" as asserted by the Examiner. Furthermore, JP '640 does not teach "bonding a copper foil to a polyimide substrate followed by heat treating to form the laminate" as asserted by the Examiner.

The English translation of JP '640 also provides Examples and Comparative Examples beginning on page 8 thereof. The Comparative Example describes that "a press was used for bonding the copper foil thereto, at a predetermined temperature and under a predetermined pressure as in Table 1." Examples 1 to 5 describe that copper foil was bonded to a thermoplastic polyimide. In these examples, a press was used for bonding a copper foil at a predetermined temperature and under a predetermined pressure as in Table 1. Examples 6 to 8 indicate that the same procedures as in Examples 1 to 5 were employed. Nowhere do these examples describe the conditions asserted by the Examiner.

In Example 9, a mixture is cast into a sheet. Copper was then deposited on the sheet in a mode of chemical plating. Nowhere does this example describe "bonding a copper foil to a polyimide substrate followed by heat treating to form the laminate" as asserted by the Examiner.

In the Examiner's Response to Arguments, the Examiner states that applicants argue that the prior art teaches applying heat to a laminate comprising the conductor layer and a polyimide and not forming the laminate simultaneously with the heating step, i.e., a post heat treating step on a laminate. This is not correct. Apparently, the Examiner was attempting to describe arguments with respect to what is considered to be the claimed invention.

The Examiner further states that the claims can be broadly read as being performed simultaneously and would be met by the reference's "heat pressing." This statement of the Examiner is also incorrect.

More specifically, as described above, claim 1 requires "forming at least one conductor layer directly adhering with at least one of the thermoplastic polyimide surfaces to obtain a laminate." Using JP '640 as an example, this step can be met only after heat pressing as described in Examples 1-8 of JP '640 or after copper was deposited on the sheet by chemical plating as described in Example 9. As such, JP '640 does not teach each and every element required by claim 1, specifically the other step of "heating said laminate after said laminate is formed so that the adhesion strength between the thermoplastic polyimide and the conductive layer is enhanced." In other words, the first step of claim 1 requires that the conductor layer adhere with a thermoplastic polyimide surface. This condition is only met after the process of JP '640 is completed.

During the interview, the Examiner maintained that placing a foil on a polyimide surface could be considered to meet the limitations of the forming step. However, such is not a reasonable or proper interpretation of the term “adhering.” The ordinary dictionary definition of “adhere” requires more than merely placing a foil on a surface.

The Examiner in the Office Action also comments that JP ‘640 could “be suggestive” of a subsequent heating step after the coating of the metal. By this admission, JP ‘640 does not anticipate the present claims. Therefore, the anticipation rejection should be withdrawn.

Independent claims 2, 3, 17 and 18 contain similar limitations as set forth in claim 1 above.

Claims 1-9, 13, 17 and 18 were also rejected under 35 USC § 102(b) as being clearly anticipated by Chen et al. (USP 5,156,710) or Shiotani et al. (USP 5,741,598). This rejection is respectfully traversed.

Each of Chen et al. and Shiotani et al. fails to anticipate the language of the claims for the same reasons discussed above. In particular, these references fail to teach forming a conductor layer directly adhering with a thermoplastic polyimide. Simply placing a metal foil atop a polyimide is not “adhering with.”

The Examiner makes the statement that the metal layer can be applied by a variety of ways, but laminating a metal foil is most preferred. This statement of the Examiner is not supported by Chen et al. Chen et al. contains no disclosure of applying the metal layer other than by use of a foil.

Shiotani et al. merely teaches adhesion of a metal film or metal foil onto polyimide by a hot melt method. Shiotani et al. does not teach or suggest “heating said laminate after said laminate is formed so that the adhesion strength between the thermoplastic polyimide and the conductor layer is enhanced.” Thus, the anticipation rejection should be removed at least for this reason.

Claims 10 and 11 were rejected under 35 USC § 103(a) as being unpatentable over Chen et al., or Shiotani et al. in combination with JP ‘640 or JP 11-240,106. In this rejection, the Examiner acknowledges that Chen et al. and Shiotani et al. each fail to teach a dry plating method.

The Examiner argues that JP ‘640 “teaches sputtering or vapor depositing a metal atop a thermoplastic polyimide sheet and heating to form the laminate film.” This assertion is not correct. As noted above, in the embodiments of JP ‘640 which teach sputtering or vapor deposition, no subsequent heating is applied. Example 9 of JP ‘640 clearly indicates that no heating or pressure is applied after the copper is deposited. In the remaining examples, a copper foil is bonded to thermoplastic polyimide by use of pressure and temperature. However, a subsequent heating of the laminate after said laminate is formed is not disclosed or suggested.

In regard to JP '106, the Examiner argues that since JP '106 teaches applying a metal or metal oxide layer by vapor deposition or sputtering, it would have been obvious to modify Chen et al. or Shiotani et al. to form the conductor layer by dry plating "with the expectation of achieving similar results." However, as has been previously shown, the claimed invention achieve unexpected results. Furthermore, there appears to be no motivation to make the modification suggested by the Examiner. Each of Chen et al. and Shiotani et al. is specifically directed to use of a metal foil or metal film. In contrast, JP '106 merely teaches direct lamination of metal or metal oxide on a heat-resistant film. There would have been no motivation for one of ordinary skill in the art to take the teachings of JP '106 and perform the additional processing steps of Chen et al. and Shiotani et al. As such, the Examiner has failed to raise a prima facie rejection of the claims based upon the combination of Chen et al. or Shiotani et al. with JP '106.

At the interview, the Examiner initially believed that JP '106 could be of relevance based upon the abstract of record. However, JP '106 does not provide the teachings which Chen et al. and Shiotani et al. lack. A reading of the machine translation of JP '106 shows that the drying and heating steps pertain to formation of the polyimide film itself prior to formation of metal or metal oxide. Furthermore, JP '106 discloses a non-thermoplastic polyimide layer, not a thermoplastic polyimide, as evident from heat treatment carried out as high as 480°C for 4 minutes.

Amendment
Application No. 09/782,169
Attorney Docket No. 010164

Claim 12 was rejected under 35 USC § 103(a) as being unpatentable over JP '640 alone or Chen et al. or Shiotani et al. in combination with JP '640 or JP '106 further in combination with Ameen et al. Ameen et al. fails to provide the teachings which the other references lack, as discussed above.

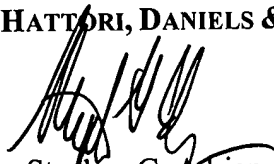
For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned attorney.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Stephen G. Adrian
Attorney for Applicants
Registration No. 32,878
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

SGA/arf

Attachment: Petition for Extension of Time